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(54) **Tape measure**

(57) A tape measure comprises a tape 10 a gripping ring 12 with an opening and a swingable hook 14 fitted at one of its ends 18. The hook is pivoted on the gripping ring about a spindle 22 disposed transversely of the longitudinal direction of the tape 10 and leaves the opening in the ring 12 substantially accessible when swung towards the gripping ring 12. The swingable hook 14 is of laminar material, which is bent to the shape of a U, with the two limbs 24 of the U, being disposed transversely of the spindle 22 and carrying the spindle 22.

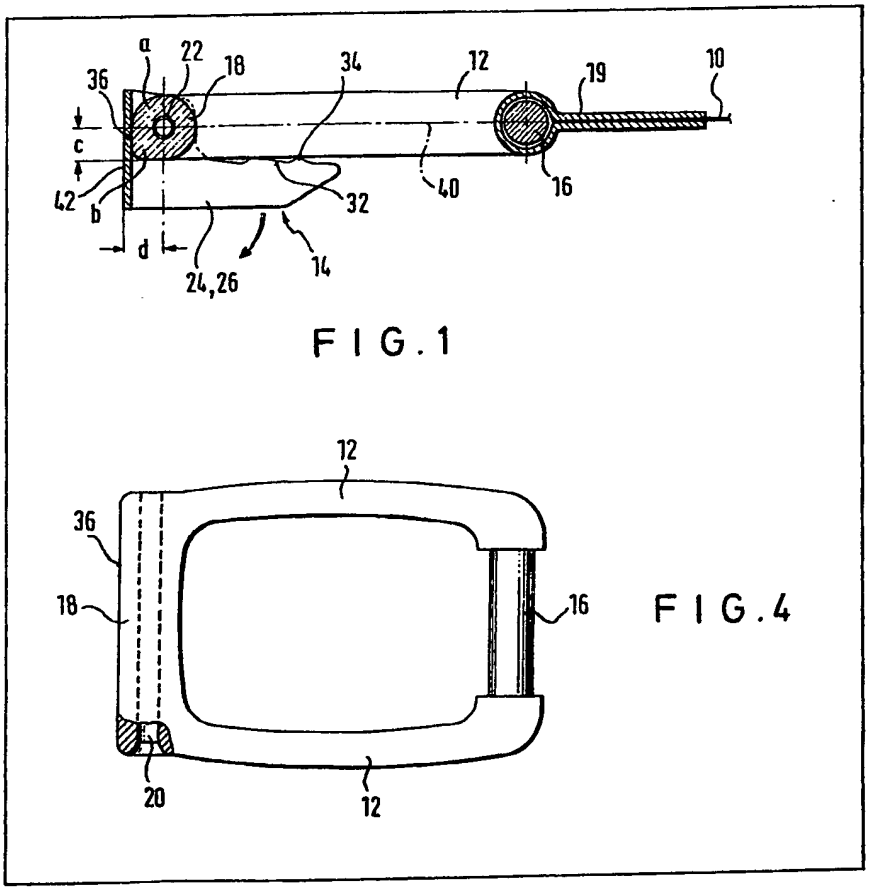

FIG. 1

FIG. 4

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FIG. 1

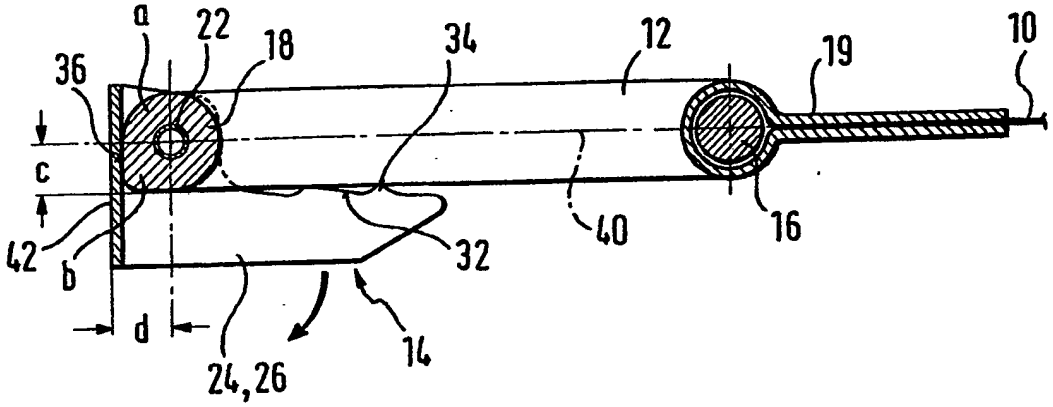


FIG. 4

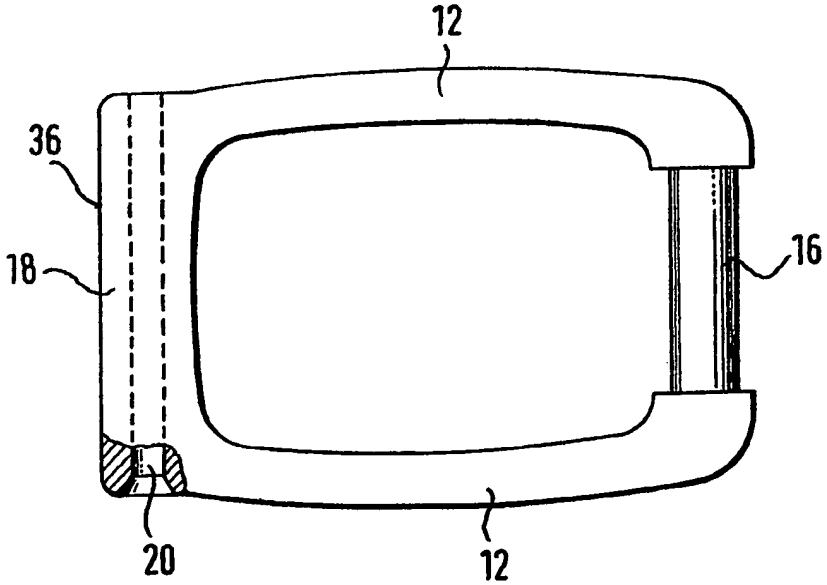


FIG. 2

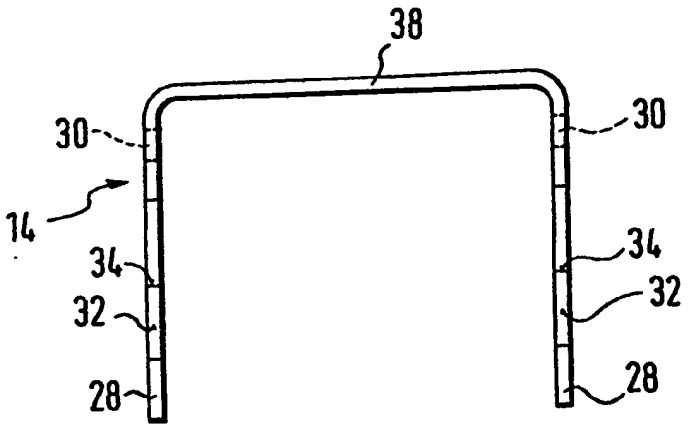
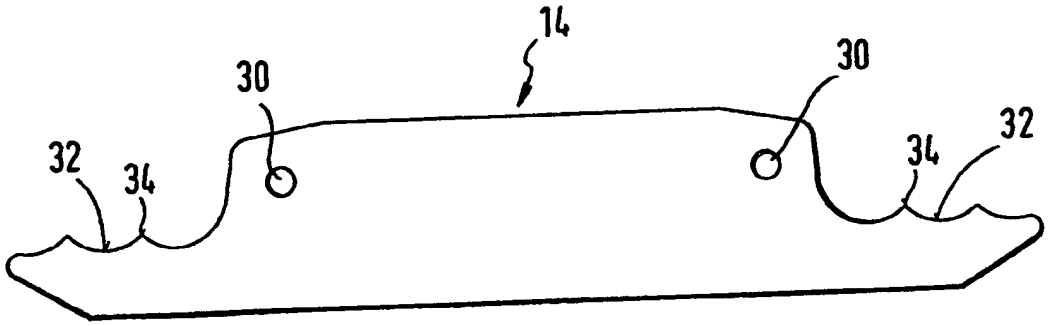


FIG. 3



SPECIFICATION

Tape measure

The invention relates to a tape measure with a gripping ring and a swingable hook fitted at one of its ends.

To enable long objects, e.g. tree-trunks to be measured by one man only, the tape measures normally used are provided with a hook which is attached to the gripping ring in such a way that, in the swung-out position, the inner face of the hook coincides with the zero mark of the graduations on the measuring tape. In measuring, the leading end of the tape is engaged by means of the hook behind an edge of the object to be measured. To prevent the hook from slipping, it is provided with a number of sharp points which press into the wood when the tape is pulled. The person carrying out the measurement can then release the leading end of the tape and can move along the object concerned while extending the tape measure (the pull preventing the hook from sliding off again), and he can read off the length of the object at its opposite edge. When the pull on the tape is eased, the hook falls down from its point of application, so that the tape measure immediately winds in again, and a further measuring operation can be carried out.

In such a tape measure, disclosed in U.S. Patent Specification No. 1 726 960, the opening formed by the gripping ring is uncovered when the hook is swung against the ring so that the user can put his finger through the opening formed by the gripping ring so as to be able to manipulate the free end of the tape measure in the required manner. The swingable hook has the shape of a letter H, the plane of which is parallel with the plane of the wall in the swung-to position. In the loading direction of the hook in the swung-open position, however, the moment of resistance of the limbs in the load direction is very small, so that the thickness of the material used for the swingable hook must be relatively great. Although the crossbar of the H strengthens the swingable hook, such increased strength contributes very little towards increasing the moment of resistance. Furthermore, the crossbar must be close enough to the pivotal axis of the swingable hook that extends through the limbs of the H that the crossbar reduces the opening formed by the gripping ring, with the result that either the ring must be of very great size, or that the opening through the ring that remains uncovered when the hook is swung-to may be too small for a relatively thick finger to pass through it.

Th object of the present invention is therefore to improve a tape measure f the initially stated kind in such a way that, while use is made of simple constructional means, rigidity is imparted to the swingable hook in the directi n in which pull is appli d to the tape measure.

A tape measure according t the inv ntion has a gripping ring with an opening and a swingabl hook fitted at one of its ends, the gripping ring b ing attached to the tape, and th swingable h ok being pivoted n the gripping ring about a spindle disposed transv rsely of the longitudinal direction of the tape, the swingable hook leaving th op ning in the gripping ring substantially accessibl when the hook is swung towards the gripping ring, and th swingable hook being of laminar material, which is bent to the shape of a U, with the two limbs of the U, being disposed transversely of the spindle and carrying the spindle.

This arrangement permits the material used for the swingable hook to be of small thickness, since the narrow side of each of the limbs of the U-shaped swingable hook extends in the direction in which the tape is pulled, and therefore the cross-sectional length in the direction of pull is considerably greater than the thickness of the material. However, in the calculation of the moment of resistance of the cross-section, this large dimension enters into the third power, so that this swingable hook is stable in the direction of pull, whereas in the direction transverse thereto it is of such small dimensions that the gripping opening formed by the ring is hardly interfered with at all when the swingable hook is swung against the gripping ring.

Preferably, the swivel spindle of the swingable hook passes through that portion of the gripping ring that is disposed opposite that ring portion whereby the gripping ring is attached to the tape, so that the limbs are disposed outside the gripping ring.

To ensure that, when the swingable hook is swung against the gripping ring, the zero mark of the tape measure is formed by the web of the U-shaped swingable hook, and in the position of the hook when swung out through 90 degrees, the zero mark is formed by those narrow sides of the limbs of the swingable hook that are applied to the tape, the distance, from the swivel spindle of the swingable hook, to that portion of the web that is remote from the swivel spindle of the swingable hook is equal to the distance, from the swivel spindle of the swingable hook, to a normal drawn from the narrow sides of the limbs, which limbs face the tape and the gripping ring, are at right angles to the face of the web and form bearing faces. To ensure, by simple means, that the narrow sides of the limbs of the swingable hook that act as bearing faces are able to hook on to the object to be measured, these narrow faces are preferably provided, along their length, with one or a series of depressions so that sharp raised portions are formed between the depressions.

Preferably the swingable hook is produced in a simple manner by stamping out the contour of the hook from a flat material and then bending the material to the form of a U. During the stamping operation it is possible to form the openings which serve to receive the swivel spindle. The above-mentioned depr ssions can likewise be stamped out along the peripheral line.

For the purpose of reinf rcing the sharp raised portions, th depressions are all rounded in such a way that the rounded porti ns lie adjacent the points, and the r unded portions may have differ nt radii so that the tips acquire a saw-tooth shape.

To ensure that the swingable h ok swings open in one direction and is prev nted from so d ing in the other when in the swung-to position, that portion of

the gripping ring that accommodates the swivel spindle of the swingable hook extends along a straight line and has a cross-section which, in on quarter-sector of that cross-section half that is remote from the point at which the gripping ring is attached to the tape, has a rounded periphery, and in the other quarter-sector, an angled periphery with a planar surface lying at right-angles to the central plane of the gripping ring.

To help understanding of the invention, a specific embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a longitudinal section through the end of a tape measure in accordance with the invention, showing its gripping ring and swingable hook;

Figure 2 is a plan view of the swingable hook alone as seen in the direction in which it is applied;

Figure 3 shows the swingable hook prior to its being bent into the shape of a U; and

Figure 4 is a view of the gripping ring in the direction of the central axis of the opening formed by it.

In Figure 1, the actual tape 10 of the tape measure carrying the measuring graduations is shown only in part, this part being the attachment zone between the tape 10 and a gripping ring 12 and a swingable hook 14 pivoted on this ring.

By that portion 16 of the gripping ring 12 that is presented to the tape 10, the ring is connected to the tape 10 via a fitting 19 surrounding the ring, the arrangement being such that the gripping ring 12 is swivellable relatively to the fitting 19.

The ring portion 16 is rectilinear and is of circular cross-section, the diameter of which portion being smaller than that of the zones of the gripping ring 12 that are adjacent thereto, so that the fitting 19 merges smoothly with these adjoining zones. Formed in the oppositely disposed ring portion 18, which is likewise rectilinear, is a bore 20, which accommodates the swivel spindle of the swingable hook 14. As shown in Figure 1, the spindle may take the form of a tubular rivet 22. In this way the swingable hook 14 is pivoted on the portion 18 of the gripping ring 12.

The swingable hook 14 is preferably made of thin sheet-metal, although other materials may of course be used for the purpose. Typically, the sheet-metal has a thickness of 0.6 mm. The swingable hook can be produced in a particularly simple manner by stamping out a blank, shown in Figure 3, from a metal sheet and then bending it to the U-shape illustrated in Figure 2. Thus the swingable hook consists of two limbs 24, each having a portion 26 of large area, and a narrow side 28, see Figure 2, serving as an application face. Since the swivel spindle 22 extends through the portions 26 of the limbs 24, th narrow side 28 is disposed in the direction in which pull is applied to the tape 10 of the measure, so that the cross-sectional dimension of the limbs 24 in th direction of pull are considerably greater than in the transverse direction which corresponds to the thickness of the material. The tubular rivet 22 is inserted thr ugh a hol 30, see Figure 3, formed in ne of the limbs 24, and int the bore 20 extending right through the gripping ring 12, the riv t then projecting beyond the hole 30 in the other limb. The ends of th tubular rivet, projecting beyond the holes 30, are flanged by a riveting operation, so that the swingable hook 24 is pivotally connected to the gripping ring 12.

The narrow sides 28 of the limbs 24 of the swingable hook 14 are provided with fully rounded-out depressions 32, see Figure 3, which, between each two of them, form sharp raised portions 34 which, when the swingable hook is in the swung-open position, engage the object to be measured. By the use of different radii for the rounded-out portions, these raised portions may be given a saw-tooth form, see Figure 1.

The cross-section of the ring portion 18 is illustrated in Figure 1. The periphery of this cross-section is rounded in the quarter-sector *a* to correspond to a fixed radius. The subjacent quarter-sector *b* is of angled form so that a planar face 36 is formed on that side remote from the tape 10.

The swingable hook is shown in Figure 1 in the position in which it is swung against the gripping ring 12. In this position, the web 38 of the hook 14 that interconnects the limbs 24 bears against the surface 36 of the ring portion 18, so that further swinging of the hook 14 in the anti-clockwise direction is not possible. The swingable hook 14 can be swung from this position in the clockwise direction until the web 38 comes to bear against the top (Figure 1) surface of the gripping ring 12. In this position, the imagined line interconnecting the sharp raised portions 34 is at right-angles to the central plane 40 of the ring.

The distance *c* between the imagined line interconnecting the sharp raised portions 34 and the central plane 40 of the ring, extending through the swivel spindle of the swingable hook, i.e. the distance between the normal and the swivel spindle is equal to the distance *d* between the outer face 42 of the web 38 in the swung-to position of the hook 14, and the swivel spindle in the direction of a normal. This determines the form of the limbs 24 shown in Figures 1 and 3, since in the swung-to position of the hook 14 as shown in Figure 1, the outer face 42 of the web 38 constitutes a bearing face forming the zero mark of the tape measure, and in the swung-open position, the imaginary interconnecting line through the sharp raised portions 34 constitutes a bearing plane forming the zero mark of the tape measure.

The above described tape measure has the advantage of a simple construction of its swingable hook which at the same time is rigid in the direction of measuring. This is achieved without adversely affecting access to the opening in the gripping ring when the swingabl hook is swung against it and with a small wall-thickn ss of the hook.

CLAIMS

1. A tape measur having a gripping ring with an opening and a swingable hook fitted at one of its ends, the gripping ring being attached to the tape, and the swingable hook being pivoted on the

gripping ring about a spindle disposed transversely of the longitudinal direction of the tape, th swingable hook leaving the opening in the ring substantially accessible when the hook is swung towards the gripping ring, and the swingable hook being of laminar material, which is bent to the shape of a U, with the two limbs of the U, being disposed transversely of the spindle and carrying the spindle.

2. A tape measure as claimed in Claim 1 wherein the spindle passes through that portion of the gripping ring which lies opposite the portion via which the gripping ring is attached to the tape so that the limbs lie outside the gripping ring.

3. A tape measure as claimed in Claim 1 and Claim 2 wherein the distance from the axis of the spindle to the surface portion of the web remote from the spindle (and the tape when the hook is swung towards the gripping ring) is equal to the distance between the axis of the spindle and a surface on the narrow side of the limbs, which narrow side is presented to the tape and the gripping ring, is at right angles to the surface of the web and forms the bearing face.

4. A tape measure as claimed in Claim 3 wherein the narrow side of the limb is provided with a succession of depressions along its length, so that sharp raised portions are located between the depressions.

5. A tape measure as claimed in Claim 4 wherein each depression is of generally rounded-out shape.

6. A tape measure as claimed in any preceding claim wherein the spindle is formed by a hollow rivet, which extends through the ring portion, remote from the tape, and the limbs, the projecting ends of the tubular rivet being flanged to effect attachment.

7. A tape measure as claimed in any preceding claim, the portion of the gripping ring that accommodates the swivel spindle extends rectilinearly and has a cross-section which has a rounded periphery in one quarter-sector of that half of the cross-section remote from the point at which the gripping ring is attached to the tape, and in the other such quarter-sector has an angled periphery comprising a flat face disposed at right angles to the central plane of the gripping ring.

8. A tape measure substantially as hereinbefore described with reference to the accompanying drawings.

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